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ABSTRACT

Competence-based education is defined and described as a system, and reference is made to its application to undergraduate education in public administration. Competence-based education emphasizes an integration of theory and practice in learning and curriculum and the organization of educational goals into explicit outcomes. The attainment of educational goals serves as the basis of the learning, assessment, and credentialing process. Competence-based education as a system seeks to teach those competences that are required in the real world. The three critical ingredients for an effective competence-based educational program are goal clarification, operational specification, and assessment. From the field of public administration there have been warnings against overdefinition, since the professional abilities needed in public administration tend to be analytical/integrative. Five benefits of competency-based education are discussed. (SW)

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Competence-Based Education: Its Nature and Purposes in Relation to Undergraduate Public Administration

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THE NATURE AND PURPOSES OF COMPETENCE-BASED EDUCATION

What is Competence-Based Education? Competence-based education (CBE)*1 is an educational approach which is distinguished by its emphasis on an integration of theory and practice in learning and curriculum and the organization of educational goals into explicit outcomes which are defined and shared by all concerned with the cornerstones of the learning/assessment/credentialing process.

> The unique strength of PBTE is that it challenges all who touch it to be open about their intentions and explicit about how they will decide if their hopes are fulfilled. The ends -- at bottom nothing less than the purposes of American education --must be made as explicit as possible and the means of achieving them must stand the test of relevance. If these concerns are addressed seriously, the Committee believes, all education stands to gain. If the purpose of various aspects of our educational system cannot be stated clearly, we had better recognize that fact and consider carefully its implications... Genuine commitment to a PBTE approach forces one to face up to the difficult tasks of goal determination and evaluation of outcomes; therein may lie its greatest value. (emphasis added) (PBTE # 16,p.11)

Thus,

> The unique quality of competency-based education is that it teaches and measures competencies rather than basing education and assessment on courses taken, time invested, or credits earned, i.e., ... competency-based instruction places more emphasis upon exit rather than entrance criteria. (pp.2-4, Anderson)

The formula ... is deceptively simple: careful definition of performance goals in assessable terms and guidance of instruction by evaluation of learner performance. It might well be argued that any sensible approach to instruction includes formulation of goals and assessment of student progress.[2] And so it does. The essential distinction lies in the degree of explicitness and realism with which goals are defined -- and the degree of rigor with which the evaluative process is carried out in direct consonance with the stated goals. (PBTE # 16, p. 8)

*See footnotes at end of paper.

This emphasis on attainment of educational goals as the basis for award of credentials results in an instructional process which has the following characteristics:

- goals are clearly articulated in operational terms, and are public.
- "outcomes can be accurately communicated and measured" (P/K p. 1)
- curriculum is revised via feedback to reflect changing needs in the real world and improve effectiveness of existing programs.

These qualities can also be described in the following ways:

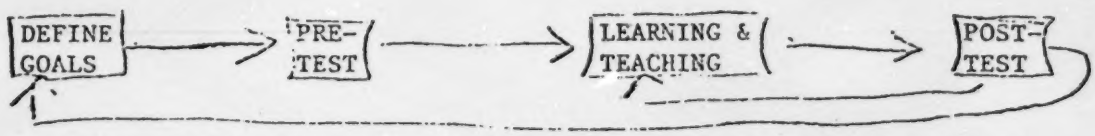
1. Instruction is individualized to a considerable extent.
2. Learning experiences are guided by feedback.
3. The program as a whole has the characteristics of a system.
4. Emphasis is on exit requirements.
5. The learner is considered to have completed the program only when he has demonstrated the required level of performance.
6. The instructional program is not time-based in units of fixed duration. (PBTE # 16, p.7)

CBE as a System.

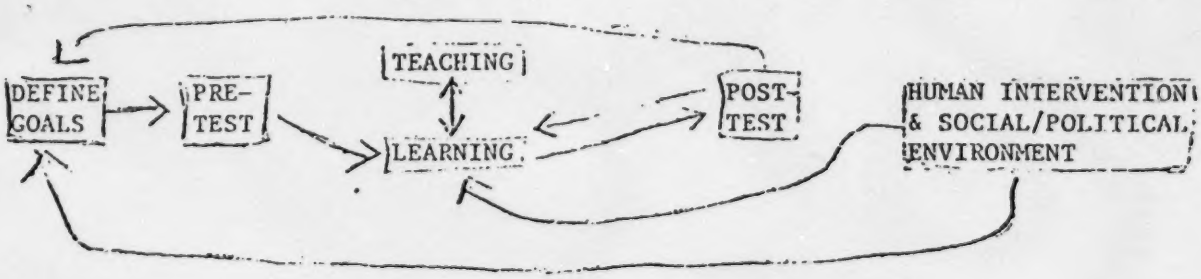
The term cybernetics was coined in 1947 by Norbert Wiener and others (Cybernetics, 1961, 2nd ed., pp.11-12) to designate those systems of "control and communication in the animal and the machine." There are many kinds of systems, from international systems to ecological systems.[3] According to cybernetics theory any system is defined by input, ordering mechanism (i.e., the hunting device), and output. A critical element of a system is the feedback mechanism. It is the differences in feedback sources which distinguish

between open and closed systems. Feedback in a closed system ignores "background noise" (i.e., extraneous information) and seeks to minimize entropy (i.e., information overload which leads to disorganization), to maximize operational self-steering. Open systems rely on the latter function of feedback, but they are not generally insensitive to background noise. Bertram Gross argues that all human and social systems are necessarily open systems (implying that closed systems apply to mechanics alone).[4] Human intervention and the social/political environment create feedback in open systems which leads to changes in goal demands, new knowledges and new techniques for ordering.

Obviously CBE as a system implies an open systems approach. Schematically the process including the feedback loops would be represented as follows:



Since goals are defined beforehand, input is chosen on the basis of desired output. In the closed system, output is defined by input and ordering mechanisms. A comparison of pre-test and post-test findings measures the efficacy of the ordering mechanism, i.e., teaching and learning. The post-test stage also informs via the feedback mechanism learning and goal definition. However, in reality, the above diagram omits outside factors, e.g., the social/political environment.[5] Thus revised, the systems view of CBE would graphically appear as:



Notice that the feedback from the open environment corrects the process and outcome not only according to the internal effects of the process of the system, but also according to the external reaction to and the demands for changed outputs of the system.[6]

Thus competence-based education as a system seeks to teach those competences which are required in the real world (i.e., one feedback source in the open system). In order to develop and implement competence-based education one must address both the internal system and the open system. Ms. Huff highlights three basic questions with which to begin:

1. What does it mean to _____ competently or to be a competent_____?
2. How do we determine whether students can _____ competently or whether they are competent_____s.
3. What do we do as educators to promote these kinds of competence?

(Pottinger, p.3)

The first question relates to the definition of goals. While the academic institution takes responsibility for this, consideration of demands for improved public service from the external environment also is taken into account. The second question relates to the "pre-testing and post-testing" sequence in the diagram above. The third question addresses the box marked"learning." The second and third questions together define "competence" in operational terms. And assessment becomes a key element in competence-based education. As Ms. Huff claims:

> ...(Some) educators (interested in reform) ... have been content to simply define or redefine institutional and program goals, charge the faculty with their adoption, and not concern themselves with ...(assessment)...(But, under CBE) faculty are being required to

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> state explicitly the criteria upon which student achievement will be judged, and some sort of monitoring and assistance system is being introduced to assure the appropriateness... of assessment instruments and criteria of evaluation employed... Therefore, if faculty are to change the focus of their attention, then 'tests' students are required to take must emphasize dimensions of ability commensurate with the avowed goals of the institution, program, or particular instructor. (pp. 1-2, Pottinger)

> The fact is that unless these steps are taken, the time, effort, and money spent in formulating or reformulating program goals will have been wasted -- that things would not change much if they changed at all. (p. 1, Pottinger)

Therefore, the three critical ingredients for an effective competence-based educational program are: goal clarification, operational specification and assessment. And, while obviously these should be interrelated, the task is not an easy one. The following table illustrates the amount of variation and the challenges of integration among some competence-based programs.

Systems imply integration, and competence-based educational systems must continuously have integration in mind.

> ...the point should be made ... that the term 'competencies' ...does not refer solely to discrete skills and descriptive knowledge, but may include much more complex attributes such as the ability to marshal evidence, to reason logically, to appreciate beauty, etc. (PBTE # 16, p. 8)

The major focus of competence-based education is lost unless a program defines competencies to have "as many elements and complexities of real life situations as possible." (Pottinger, p. 21) This means overcoming the concentration on individual skills and knowledges in favor of a more comprehensive and interactive approach because

> Measures typically used to assess job task performance and performance relating to the mastery of units in a curriculum typically have little bearing on how subunits interact. For any given job, life task, or individual performance, component skills in one area can compensate for deficiencies in others creating a variety of combinations of individual performance levels which could theoretically "add up to" equivalent overall performance. Thus minimal levels of performance on individual variables (which compromise overall competence) may have little meaning by themselves. Their interactions with respect to outcomes may have far greater significance. (Pottinger, p. 20)

Jack Merwin in evaluating performance-based teacher education (PBTE) observed in 1973 that "The most comprehensive collection of statements of teacher competencies available to date is The Florida Catalog of Teacher Competencies." (PBTE # 12,p. 7) He concluded that

> The list is long ... (but) it takes only a brief look at the statements of competencies above from the Catalog to ascertain that they are far from sufficient for giving the direction needed for objective observation of those aspects of a performance that are relevant to determination of competency vs. no competency. This is obviously the case for these examples and most, if not all, of the competency statements in the Catalog. Acting only on these (selected) competency statements it is highly unlikely that two trainers would independently structure the same assessment procedures or that two observers would attend to the same aspects of a performance. (PBTE # 12, pp. 11-12)

Michael Shugrue further adds that

> The danger still exists that PBTE programs will settle for competencies stated in narrow behavioral terms and will spend their energies assessing what is least important for the creative, continuing growth of ... (the student). (PBTE # 11, p. 13)

Pottinger begins with Knott's conclusions (1975)

> ... Competence as a goal of liberal education refers to an overall characterization of the individual rather than to the possession of discrete competencies .. Mastery of a set of specific competencies does not necessarily produce a liberally educated person. Specific competencies must be synthesized or integrated into an effective whole which is more than the sum of the parts. The concern of liberal education refers to the competence of the person rather than the collection of possibly unrelated competencies ... the emphasis in assessment of students in a competency based liberal education is holistic rather than fragmented. If assessment criteria and procedures do not reflect this emphasis and focus instead on specific unintegrated competencies, the primary goals of liberal education may be, at best, casually overlooked or, at worst, systematically ignored. (emphasis added; Pottinger, p. 8)

suggests a series of corollaries for developing a competency-based program.

A. Identification and Definition of Competencies
   - Corollary 1: 'New" competencies must be identified and operationally defined.
   - Corollary 2: New competencies should have general significance to a wide variety of career and life outcomes.
   - Corollary 3: New competency definitions and measures developed for their assessment should be easy for faculty and students to comprehend and view as meaningful and useful.

Corollary 4: Competencies should be empirically linked to external realities.

B. Instrumentation, Techniques and Processes
Corollary 5: We need to discover new ways of measuring abilities (competencies).

C. Standardization or Establishment of Levels of Performance
Corollary 6: Standards of performance for awarding credentials should acknowledge levels of performance required for entry into roles outside the academic setting.
Corollary 7: New attempts to define and assess learning outcomes should not be guided solely by attempts to make them functionally equivalent substitutes for traditionally assessed school achievement.

Thus, educationally, as Pottinger so aptly points out the goal is to develop a truly integrated program of competencies. But, as he admits, fragmentation of skills, etc. better describes some competence-based programs than does this sought after integration of competencies.

In the field of public administration also the call for integration and warnings against overdefinition are frequently heard. In general the professional abilities needed in public administration tend to be analytical/integrative. Frederick Mosher describes many public administration departments as concentrating on "an ever increasing compartmentalization, reductionism and specialization in narrower sub-segments of segments of disciplines ... which, by their nature tend to discourage or totally exclude broader studies of social problems." Instead the future public administrator must have a

> primary orientation to <u>whole people</u> rather than things, as in engineering and the hard sciences, or to parts of people, as in medicine, or to particular aspects of people, as in economics and political science. ("End Product Objectives of Pre-Entry Level Professional Education," pp. 153-156)

Education is a kind of preparation for the future and as such competence-based education seeks to define those "competencies which are absolutely essential to many jobs" (p. 9, Pottinger), and which "are critical if individuals are to take advantage of life's opportunities and surmount its difficulties." (p. 9, Pottinger) Moreover, it cannot be assumed that any educational experience,

however excellent, will ever impart all the information (cf. input) one will ever need to know. Therefore, one of the goals of competency-based education is to teach students how to redefine goals in the future. Or,

> Rather than being reactive to such a well defined situation, people must be pro-active in situations which provide only partial information. (Klemp as quoted in Pottinger, p. 15)

In other words competence-based education is more than a system. The Carnegie Commission on Non-Traditional Study concluded "Most of us agreed that non-traditional study is more an attitude than a system." Their reasoning applies equally to competence-based education at its best.

> Most of us agreed that non-traditional study is more an attitude than a system ... This attitude puts the student first and the institution second, concentrates more on the former's need than the latter's convenience, encourages diversity of individual opportunity rather than uniform prescription, and deemphasizes time, space, and even course requirements in favor of competence and, where applicable, performance. It has concern for the learner of any age and circumstance, ... This attitude is not new; it is simply more prevalent than it used to be ... (p. xv, Diversity by Design)

However, despite the disclaimers about how the idea is not new, "newness... in the variety and volume of combinations and structure" is most evident (cf. table). It is most important not to lose sight of CBE as "more than a system" within a system of education. And in that regard it must be remembered that

> the traditionalist and non-traditionalist are not adversaries; that one cannot supplant or supersede the other; and that they are partners in the single grand enterprise of promoting learning. (p. xvii, Diversity by Design)

In conclusion,

> A competency-based curriculum does not differ from other curricula in its goals. It differs in the assumption that the basic desired outcomes of an educational process can be stated in terms of defined and recognizable competencies and all students can be held responsible for achieving these competencies. Under a competency-based curriculum, mastery (and) learning ... is the major criterion of performance ... Further clarification of the concept of a competency-based curriculum can be gained by a closer examination of the joint use of the terms competence and curriculum. Competency may be defined as 'the state of having requisite abilities or experiences.' A curriculum is a set of designed courses or experiences. A competency-based curriculum then is one where the competencies expected of all graduates are agreed upon and defined and courses or experiences are designed to assist the student in becoming competent ... (In light of this one has to overcome the fact that the term, competency-based curriculum has become) loaded with overtones of behavioristic evaluations of learning and fragmentation of instruction into discrete learning units where the interrelationships of the parts and the whole of the desired outcomes is questionable. (p. 28, Journal of Higher Education, January/February 1975)

Benefits of CBE.

Just as it is difficult to define non-traditional study[7] so too CBE can be operationalized in various ways as we saw above. However, there are some strengths particular to CBE which must be emphasized. CBE has five major positive characteristics. First, the entire system, i.e., goal formation, assessment, and competency specification, is open for full view to all participants and observers including teachers and students. One can determine the exact progress of any one student in the competency sequence.

Second, CBE is highly realistic with careful attention to integration of theory and particularities of certain professions. For example, Nicholas Henry concludes that the individual practitioner in public administration

> as an intellectual and professional endeavor (must be able to) ... synthesize ( ) pertinent elements of political acuity, administrative techniques, and ethical theory ... given the rapidity of social change in American society engendered by political and technological developments, and the resulting propensity to govern ... on a crisis-to-crisis decision-making basis... (pp. xiv-xv, Public Administration and Public Affairs)

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in order to meet both present and future needs. The Carnegie Commission on Non-Traditional Study found the employment-related aspect of education sorely neglected (p. 62, Diversity by Design) and urged all reformers not to hide from this critical issue. They further remind us of how important educational credentialing is for the future employment of minority students.

> The rigidities of time, space, and academic credentialing have worked directly, though often covertly, to foster elitism in higher education. The aims of education properly involve the achievement of competence, understanding, knowledge, and sensitivity. (p. 50, Diversity by Design)

However,

> Many of the new competency-based institutions or programs in universities are geared to special populations such as women, racial or ethnic groups, adults, or future occupants of particular occupational roles. (Pottinger, p. 2)

While both of the above statements are basically true, the major point is missed: CBE aims to reform the educational system for all participants. While indeed one cannot ignore a special responsibility to minorities to ensure that their newly won access is educationally valid, personally meaningful and professionally warranted, these same criteria apply to everyone.

Third, CBE explicitly outlines the exact bases for credentialing and the procedure for the award of credentials. This means that students and teachers alike are clearer on what is demanded of them. This allows for less "psyching out" and more real learning. CBE also provides the basis for students to gain much stronger insights into their own progress which in turn informs their continuing development towards defined objectives.

Fourth, the CBE approach is more readily verifiable. That is, the time spent in course work or the number of books read is not the measure of competence.

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> ... learning has been equated with numbers of courses, years of attendance, and meticulous measurement of progress through rigid grading procedures and that attempts at reforming these conditions have not been carefully conceived but have merely involved the abolition of requirements or the development of such reverse images of customary instruction as survey courses which are broad but not deep, touching on everything but thorough in nothing. (pp. 2-3, Diversity by Design)

Instead the individual student's performance is assessed in CBE at several points against a series of goals which he must achieve in order to demonstrate his competence. It emphasizes what the student does rather than what the teacher entitles and assigns within a course. The uniformity of criteria for "passing" better ensures full preparation of all students in the program and guarantees greater equity among all students. On the faculty side it provides highly specific and operationally defined objectives as the basis for the award of credentials and clearly defined measures and criteria for assessing the extent to which students achieve these objectives. Faculty are thus provided with much more definite guidelines for course preparation and teaching. These facets of standardization allow for increased reliability and validity.

Fifth, CBE is oriented toward integration, not fragmentation, isolation, and randomness. This attitude is translated into multiple phases of a competence-based program. It includes relating coursework to competency objectives, relating educational methodology and course content to student achievement, relating the intermediate progress of students to ultimate end goals, and relating the development of a capacity to continuously re-examine the discreet competence-based areas in relation to each other and to the demands of the profession as it evolves.

It can be readily seen that these direct qualities of CBE deal with the concerns raised by the Carnegie Commission. Yet there are also several less obvious though still critical characteristics of CBE which emerge. In a sense

P. 12 they are applications of CBE, but they have far-reaching consequences. Creative and pro-active behavior is recognized and valued. In a rapidly changing world this attribute is the best insurance for comfortable and appropriate adaptation. For those students who have not been able to attend educational institutions in the "normal" way during late adolescence, CBE permits responsible credentialing of prior learning. In other words, it maintains standards and while allowing for variety among individuals, does not result in a welter of idiosyncratic achievements. Access to learning is greatly extended with CBE because the time and space dimensions of education are much more flexible. This means that adult learning and credentialing opportunities are greatly enhanced. [8] (cf. p.41, Diversity by Design)

> The formal educational system from beginning to end is based on the ideas that groups of people can be instructed simultaneously for a set period of time, that by the laws of statistics they fall into a normal distribution of ability and of performance, that what they learn is capable of being added up to a given number of semester or quarter hour credits, that these credits are interchangeable with one another regardless of content (but vary in meaning under formal rules such as the one which dictates that one hour of class time equals two hours of laboratory work), and that the whole system is made coherent and manageable by being isolated from the external world and being operated in a separate and commonly shared geographic setting ... Such a systematized approach was perhaps inevitable, given the degree of efficiency and the size of the task made necessary by the egalitarian nature of American higher education. Fortunately, there is a long and healthy history of individuals and groups who have found ways to circumvent the system, and, as the Commission's studies show, at least a third of American colleges and universities have developed unconventional approaches more flexible than this system. The theoretical base for such approaches is now being laid so that people who use them need no longer feel like rebels.
> (pp. 49-50, Diversity by Design)

> Many people believe that the present systems of certificates, diplomas, and degrees are inadequate or inappropriate to meet current needs. The Supreme Court ... has held that employers cannot enforce educational requirements, or test results as a condition of employment unless they are specifically related to the work required of a job applicant. And a growing number of educators are convinced that new systems of evaluation and credentialing are required everywhere in education ... It is high time we turned our know-how in this field to an attack on the

> rigid credentialing arrangements we have inherited from the past and to the creation of tests and systems of guidance that will channel people of all ages into jobs for which they have aptitude and skill, regardless of whether acquired in school or through experience. (pp. 126-7)

Summary.

Competence-based education is therefore, more than a simple system, is innovative though not fully new, and most importantly seeks to vigorously renovate education in order to meet the older honored demands for quality and the newer calls for relevance and career preparation.

> An educational system dedicated to the promulgation of true learning establishes its validity, enhances its strength, and maintains its societal relevance in the same way as does the individual -- by action and interaction. But as any system advances in age and becomes comfortable in custom, as it grows in size and complexity, it is sometimes more fascinated with keeping learning in good, measurable, controllable order than with recalling its fundamental goals ... This is what some observers -- critics and scholars of education, lay citizens, students, and even faculty and administrators -- believe has happened ... They feel that more attention has been given to the form than to the spirit of learning; that knowledge has been neatly departmentalized, with insufficient integration of ideas to permit them to grow in meaning through association.
> (pp. 2-3, Diversity by Design)

Footnotes

1. Other synonyms for competence-based education are performance-based and competency-based education. There is quite a bit of ambiguity over the meanings and uses of terminology. Thus, "competencies" is used variously to mean "component elements of competence" and "areas of competence." (p. 4, Pottinger)

2. Viewed in this light, CBE doesn't seem fundamentally different from all good education.

3. In addition to Wiener, see the critique of systems theory as applied to urban planning in Martin Kuenzlen, Playing Urban Games (1972). Kuenzlen is not against systems approaches per se but he does warn of their indiscriminate uses. One could say that he is making a play for more open systems theory.

> ... systems analysts constantly refer to the incompleteness and restricted capacities of their theories and models ... (Nevertheless) The completed models are given to funding commissions and to experts and social engineers for transfer into practical tools and instruments ... Second-hand applications of specified analyses may be the worst and most irresponsible results facing us in the future of the models systems approach ... This results in inappropriate generalizations, wrong conclusions, transfer of nonexistent problems ..." (p. 87)

4. Gross' arguments are found in The Managing of Organizations (2 vols.) New York: Free Press, 1964. Gross follows in a tradition in political and administrative science of applying cybernetics to the explanation of power and decision making. See also Karl Deutsch, The Nerves of Government, and David Easton, A Systems Analysis of Political Life.

5. The social sciences particularly reflect the changes in the environment and perceptions of context. Especially in the social sciences there are two problems: (1) having to make decisions or recommend policies on the basis of incomplete information and (2) lack of agreement on coherent, comprehensive theory by which to define a field of study. For the implication of this on the teaching of public administration see later in the paper; see also, especially, Steven Bailey.

6. Some observers argue that there are systems of systems. Or in the case of CBE it can be seen as part of the educational system within the urban system, within the political system, etc. The configuration of the relations of systems to one another may be likened to ripples in a pond (caused by one or more stones being tossed). Mathematically, the relationships are defined in terms of set theory.

7. See page xiv, Diversity by Design.

8. The Medgar Evers public administration competence-based program will initially be only classroom based. But since it is committed to increasing opportunities for prior learning, at the appropriate time, after the competencies have been piloted, implemented and refined in the classroom setting, assessment instruments will measure both prior learning and classroom based learning using the identical criteria.